DOCUMENT RESUME

ED 477 094 IR 021 822

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TITLE	Project TALENT: Creating Change in Teaching Activities.
PUB DATE	2002-06-00
NOTE	7p.; In: ED-MEDIA 2002 World Conference on Educational Multimedia, Hypermedia & Telecommunications. Proceedings (14th, Denver, Colorado, June 24-29, 2002); see IR 021 687.
AVAILABLE FROM	Association for the Advancement of Computing in Education (AACE), P.O. Box 3728, Norfolk, VA 23514. Tel: 757-623-7588; e-mail: info@aace.org; Web site: http://www.aace.org/DL/.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Computer Assisted Instruction; Elementary Secondary Education; Instructional Design; *Learning Activities; *Preservice Teacher Education; Preservice Teachers; *Teacher Education; Teacher Workshops; *Teaching Methods; Training Methods

ABSTRACT

TALENT (Teaching And Leading for Educational Needs with Technology) is a Preparing Tomorrow's Teachers to Use Technology (PT3) Implementation grant funded by the U.S. Department of Education. Besides faculty and K-12 teacher training through focused workshop sand week long institutes, TALENT has taken an innovative approach in creating "triads" consisting of a preservice teacher, a K-12 master teacher, and a university supervisor, who function as a learning community. This learning community spans two parallel activity systems: the university and the school in which the preservice teacher is placed. The project is discussed using the framework of Activity Theory, which can clarify activities and add predictive validity to TALENT's grant efforts. Includes four figures. (Contains 19 references.) (Author)

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Project TALENT: Creating Change in Teaching Activities

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Abstract: TALENT (Teaching And leading for Educational Needs with Technology) is a 2000 PT3 Implementation grant. Besides faculty and K-12 teacher training through focused workshops and weeklong institutes, TALENT has taken an innovative approach in creating 'triads' consisting of a preservice teacher, a K-12 master teacher, and a university supervisor, who function as a learning community. This learning community spans two parallel activity systems: the university and the school in which the preservice teacher is placed. The project is discussed using the framework of Activity Theory, which can clarify activities and add predictive validity to TALENT's grant efforts.

Background

TALENT (Teaching And Leading for Educational Needs with Technology) is a 2000 Preparing Tomorrow's Teachers to Use Technology (PT3) Implementation grant funded by the U.S. Department of Education. Co-directed by Bohlin, Chiero, and Harris, TALENT's purpose is to infuse instructional technology into the teacher preparation program at California State University, Fresno (CSUF). The project's overarching aim is for teacher-candidates to complete their credential programs with the knowledge and understanding to deal with the digital needs of diverse, limited English-speaking, high poverty, and rural students in the K-12 schools in which they intend to teach.

In order to empower all educators in the teacher preparation program – including university faculty both in Education and in other departments where teacher candidates take their undergraduate and subject area courses, K-12 master teachers, and university supervisors of student teachers – TALENT designed, developed, and delivered weeklong institutes and full day workshops. Topics were tailored to the participants' particular knowledge, skill, and interest level, and to their expressed needs. Typical tools taught ranged from PowerPoint, Web research, and Inspiration to digital video and virtual reality. K-12 teachers were trained along with university faculty in the institutes, and with university supervisors in the workshops. Thus, there was cross-fertilization of ideas among these three populations in the training programs (Fig. 1).

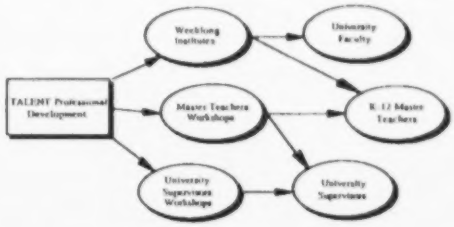

Figure 1: Project TALENT Training Activities

In the next phase of its activities, TALENT began to forge links between the university supervisors, the K-12 master teachers, and the teacher candidates using a "triad" learning community model, in which each participant could share strategies and ideas about teaching with technology with the other participants. The triad structure already existed, but the concept of using the structure as the basis of a learning community focused on technology infusion was unique to TALENT. In the TALENT model, a learning community could also consist of a larger team of master teachers, supervisors, and teacher candidates at a K-12 school. The purpose of these learning communities would be to increase comfort, confidence, and competence in technology infusion among all members and to begin to develop technology leadership abilities among the newly credentialed teachers.

TALENT as an Activity System

In both of these sets of professional development activities, the project directors envision learning as social construction of knowledge within a community of practice. Learning is situated in authentic activities, and there is plenty of time for group

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discussion and reflection to apply newly acquired knowledge and skills to both the university and the K-12 classroom. Moreover, the presenters explicitly model student-centered learning and student creation of projects.

There is a rich base of social learning theory, beginning with Vygotsky (1978) in the Soviet Union. For example, Lave (1991) envisioned knowing, learning, and cognition as social constructions, expressed in actions of people interacting within communities of practice. Koschmann (1996) coined the term "computer-supported collaborative learning" to describe learning communities that engaged in authentic, knowledge-building tasks supported by electronic interactions. Tavalin and Gibson (Sherry, Billig, Tavalin, & Gibson, 2000a, 2000b; Sherry & Tavalin, 2000) facilitated the use of online sharing of digital art and music files within a community of experts, had students post their products to a public audience, and then had the students selectively filter the ensuing feedback for the purpose of revising and refining their work. Carroll (2001) extended this notion to the entire PT3 grant initiative, in which electronic interactions among teachers and learners help to foster online communities of learners. He considered schools – including schools of education as well as K-12 schools – as connected learning communities of teachers and students, in which some participants were expert learners and others were novice learners, sharing information, supporting one another's learning processes, and constructing a common base of understanding and shared skills.

Engestrom (1996, 1998) pushed the limits of these viewpoints by envisioning communities of practice as *Activity Systems* in which individuals intentionally used tools (or technologies) to create or transform objects or concepts in order to bring about a desired outcome. In an Activity System, any given individual's actions take place within a sociocultural framework that includes the community of which the individual is a part, together with the norms and conventions of use of those tools, and the social roles or division of labor that characterize individual actions within local collective activities. The basic difference between traditional social learning theory as characterized by Lave and Wenger (1991) and Engestrom is Activity Theory's emphasis on the transformational nature of collaborative endeavors. "Activity theory suggests that collective developments occur when, through their actions, people reinterpret their environment, rebuild their activities, and reconceive of themselves (Blackler, Crump, & McDonald, 2000, p. 296)."

It is interesting to note the striking parallel between Engestrom's depiction of an Activity System and the process that may be occurring in the TALENT project regarding the adoption and use of instructional technologies to support teaching and learning. Moreover, the current work of Engestrom (2001) and his colleagues is now focusing on parallel Activity Systems, such as HMOs and hospitals, that share a common goal: to preserve and improve the health of individual patients. In TALENT, the university teacher preparation faculty and the teachers in the cooperating K-12 schools can be considered as a pair of parallel Activity Systems with a common goal: to foster good educational practice so that all children can learn. The learning community model links these two Activity Systems through the university supervisors and teacher candidates, (Fig,. 2).

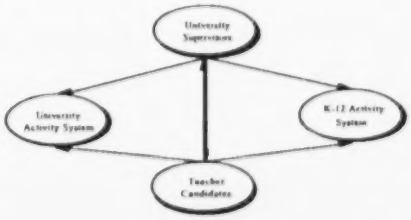

Figure 2: Parallel Activity Systems

As typically takes place within an Activity System, TALENT introduces new tools to the university faculty and to the K-12 master teachers to accomplish two planned outcomes: restructured, technology-infused courses within the university, and technology-infused lessons within the K-12 schools. For the faculty member or teacher who becomes interested enough in the new tools to acquire more knowledge about their potential uses to enhance instruction, to develop a positive attitude toward incorporating them into their own practices, and to actually make the decision to implement technology in the classroom, this is only the beginning. Each trainee must go through a learning/adoption trajectory (Sherry, 1998) to gain the necessary comfort, confidence, and competence to do so. This is the purpose of the institutes and workshops and of the continuing technical and collegial support provided by the TALENT leadership, staff, and teaching community.

Besides gaining the expertise and knowledge to use new tools to enhance instruction, there is a second order effect that TALENT hopes to bring about – increased modeling of promising practices for teaching with technology, by both university faculty and K-12 master teachers, for their respective teacher candidates. For TALENT to succeed, the project directors may wish to consider fostering the coaching and modeling process among its trainees, just as student-centered learning is explicitly modeled within the institutes. However, since the master teachers are not paid for their efforts, and since the Office of Field Placement does not wish to discourage an otherwise qualified person from being a master teacher, this is a mediating factor that could serve as an inhibitor for K-12 teacher modeling. It may be fruitful to contemplate discussing this issue with master teachers because modeling could

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help to empower teacher candidates. Moreover, the extent of modeling the use of technology for teacher candidates at field placement sites represents one of the research areas in the national evaluation of the PT3 grant initiative. Since these activities take place within a sociocultural context, the outcomes– technology -infused instruction– generate a "ripple effect" within each Activity System (Fig. 3 & 4).

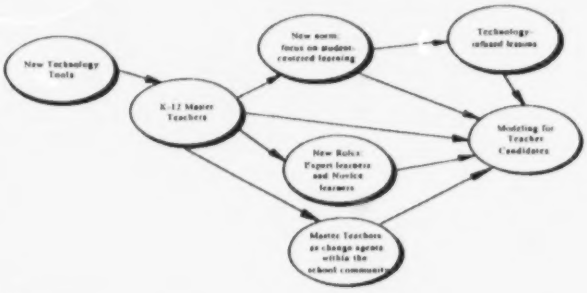
New Technology Tools
K-12 Master Teachers
New norm: focus on student-centered learning
Technology-infused lessons
Modeling for Teacher Candidates
New Roles: Expert learners and Novice learners
Master Teachers as change agents within the school community

Figure 3. K-12 Activity System

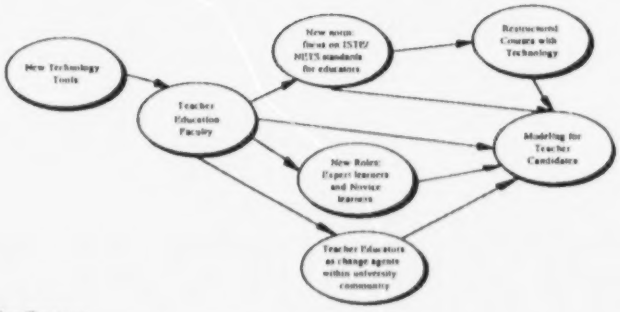
New Technology Tools
Teacher Education Faculty
New norm: focus on ISTE/ NETS standards for educators
Restructured Courses with Technology
Modeling for Teacher Candidates
New Roles: Expert learners and Novice learners
Teacher Educators as change agents within university community

Figure 4: University Activity System

Changing Norms

Rules, norms, and beliefs define the culture of an Activity System. Let us focus on the cultural norms within the university and the K-12 environment. Wilson and Myers (2000) state, "Using a tool in a certain manner implies adoption of a cultural belief system about how the tool is to be used." For example, if the norm in a specific academic department at the university is to use closed-answer tests that can be scored using scantrons, and if this continues to make a professor's day to day tasks relatively easy, then new tools and assessment strategies that make his/her job harder will not be used. They have no relative advantage over the status quo. Moreover, they require extra learning and extra work that could be better devoted to teaching and research. On the other hand, if the norm within that department, say, anthropology, is to collect data from primary sources via observations and interviews, then the use of digital video could make his/her work more fruitful. Additionally, video case studies could be shared and discussed with university students, and could become part of a living archive of the community's culture. In that case, chances are that the professor would continue to explore the use of digital video because it adds value to his/her instruction. Moreover, if other educators within the department can observe the improvement in the professor's instruction, and its effect upon the university students, then the use of digital video could very well become the norm within the department.

Besides observability, Rogers (1995) lists compatibility with potential adopters' needs and values, relative simplicity, the ability to experiment with an innovation on a limited, risk-free basis, and relative advantage over the status quo as facilitators for innovative concepts, processes, and products. In a discussion following a training session in the January 2001 institute, three faculty members engaged in the following conversation, discussing the relative advantage of using digital photography for university students' products:

> *I'm thinking about maybe teaching some of my history students about how to make a little film.*
>
> *I think that's a good thing there. You're mentioning how you would attempt to use it. How would any of the people in the room here intend to use it, even what you have learned within the last three days here?*

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Well, this just adds a whole other dimension to [student projects]. There are all kinds of cultural events going on all over Fresno. Send people out with a camera and equipment, and a video camera might be a little easier. Go to the events and put together ..a total essay on PowerPoint using the digital images, or a short introductory, maybe 5 to 10 minute short film on cultural events. That would be a no brainer!

The same holds true in the K-12 school situation. National surveys (CEO Forum on Education and Technology, 1999; NCES 1999a, 199b) indicate that students are more adept at using interactive technologies than their teachers. Technology is becoming the norm for school children. As the use of Internet searching and PowerPoint presentations by children increase, there is a chance that that those tools will become part of "the way we do things around here" within the school setting. Technology-savvy children will tend to drive learning in their teachers as well. This is especially true if greater depth of research and more sophisticated, interactive presentations will result in greater achievement for the children. RMC Research Corporation's evaluation of several PT3 and Technology Innovation Challenge grants provides evidence from observations, interviews, and focus groups with faculty, K-12 teachers, and students, which have shown that both of these outcomes are common.

In the case of TALENT, activities are focused on changing two sets of norms. At the university, the new norm would be to focus instruction on the new California state standards for teacher credentialing, which are echoed in the ISTE/NETS standards for educators. At the K-12 schools, the new norm would be a greater focus on technology-infused, student-centered learning. However, this is moderated by the schools' focus on measuring student achievement by their performance on the Stanford 9 test – an external factor over which TALENT has no control.

Changing Roles

Its division of labor – the generally accepted roles of its members – defines the social structure of an Activity System. Generally, teachers are considered experts while students are considered learners. However, this role structure is called into question when studen's have greater comfort, confidence, and competence with technology than their teachers do, and are able to use tools such as word processing, concept mapping, database searching, graphing calculators, interactive mathematics applets, Web search engines, graphic art, and digital video effectively to increase their academic performance.

Consider the self-perceived role of the teacher. If that role is to transmit information, then word processing and PowerPoint will suffice, and other tools are considered unnecessary. Moreover, if a teacher is concerned about the validity of information on the Web sites that his/her students are citing in research papers, and considers that open-ended searching could jeopardize his/her role as the expert in the classroom, then there is no reason for a teacher to support such online activities. But if the role of the teacher focuses on creating a rich environment for active learning in the classroom (Grabinger, 1996), then he/she would encourage the students to use the full range of current technologies. Such activities, in turn, transform the role of the teacher to a co-learner and co-explorer. This is indeed the case in an elementary school where one of TALENT's K-12 master teachers has his second through fourth grade classes use digital video to capture learning experiences and present them to other teachers, parents, and the entire school community.

A sudden reversal of traditional roles can cause discomfort and a disturbance in an Activity System. Brown and Palincsar (1989) considered cognitive dissonance and its ensuing discomfort to be the driver of learning. If the disturbance caused by a role reversal creates learning and makes life better, then it will be sustained; else the system will reject it and return to stasis. For example, at a high school in Vermont that participated in The WEB Project, one student became the school's acknowledged expert in digital editing. His portfolio gained for him a four-year, all-expense paid, scholarship to a leading university. Subsequently, more students became interested in digital editing, and similar activities still continue at the school. As a counter-example, consider a tenured professor who considers him/herself as a "stand-up lecturer", as mentioned by one of the TALENT trainees during a discussion in one of the training institutes. This individual was interested in using PowerPoint to enrich lectures with slides that illustrated historical and artistic trends. True, this is using technology, but it does not create a student-centered environment, nor will it change the role of the professor. As a result, our fear is that his/her students will leave the university teaching as they have been taught – as transmitters of information, rather than as creators of technology-rich environments for active student learning.

In the case of TALENT, there was a wide range of potential changes in roles, with several professors writing mini-grant proposals to restructure their courses to include more university student use of technology. As a whole, the university supervisors perceived technology as useful tools for their preservice teachers more often than did the technology-savvy K-12 master teachers, who primarily saw technology as a teacher-centered tool. However, the master teachers who co-taught several of the TALENT training sessions countered this trend, often presenting and discussing products that their K-12 students had created.

The use of technology-focused learning communities would also result in some role changes. In a learning community, each of the individuals would be a co-learner and a co-contributor, constructing knowledge as a coherent team, and serving as an interface between the university and the K-12 environment. A potential outcome of the community might be a few lessons that were relevant and appropriate for the teacher candidate's classroom, together with the necessary resources and documentation

that constitute part of a teaching unit. Another possibility would be a videotape of the teacher candidate demonstrating a promising practice for teaching with technology in the K-12 classroom. These videotapes could then be used to spark discussions within the triad. They could also be archived and used as exemplars within the teacher education program.

Changing the Community

Besides norms, rules, and roles, every Activity System has structures and boundaries that self-identify it as a system. At the university, an important structure is the criterion used for review, tenure and promotion. If a university's structure supports technology innovation with incentives like release time, extra pay, or some other form of recognition for a faculty member's effort, then the chances that more tools will be used increase.

At CSUF, there is a Center for the Enhancement of Teaching and Learning (CETL). This organization provides mini-grants for faculty members who restructure curriculum in some innovative way that enhances instruction or assessment. At the end of the January 2001 TALENT institute from faculty and teachers in the social sciences, five professors wrote mini-grant proposals for restructured syllabi; all five proposals were funded. Based on this record of success, six faculty members in the June 2001 institute for faculty and teachers in the arts, music, and humanities also expressed an interest in doing likewise. Likewise, faculty members wrote two mini-grant proposals following the mathematics and science institute in July 2001.

Another distinctive feature of CSUF is its tenure and promotion process, which rewards innovative teaching practices as an element of professional scholarship. Moreover, the Provost has an annual award related to outstanding teaching with technology, which recognizes and supports the work of TALENT. If such efforts continue to be supported by the university, then the vision of the PT3 project at CSUF may well be realized.

Driving Change in Activity Systems

Two interesting research questions emerge from studying TALENT: By what process does change in an Activity System take place? And how does this differ for connected, parallel Activity Systems? Engestrom's reply would be something like this: "Disturbances within and between Activity Systems are the driving force for growth and change." When these questions were posed at the 2001 AERA conference, one of Engestrom's peers (Barab) replied, "The direction of change depends on who holds the power." Thus, further investigation into these two questions revolves around empowering the agents within each Activity System to drive change, and empowering those who reside at the intersection of two parallel Activity Systems to moderate change between the two connected systems. Shifting the balance of power created disturbances, and "As disturbances become evident within and between Activity Systems, participants may begin to address underlying issues and to create new learning." (Blackler, Crump, & McDonald, 2000, p. 281)

In conducting case studies of PT3 grantees across the U.S., we have found that there is no a priori direction for bringing about change in either a university's teacher preparation program or the field experiences of its teacher candidates at associated K-12 schools. For example, in teacher preparation programs where strong leadership resides within the school, college, or department of education (SCDE), it is the SCDE that drives change within the university and at the partner K-12 schools. In SCDEs with a Professional Development School (PDS) structure, or with schools that have some of the characteristics of a PDS, it is the K-12 teachers who often drive the change – whether inservice or preservice.

In the case of TALENT, it is the project directors, technical support people, and K-12 master teachers who drive change, while the university system is the recipient of the change, as intended by the project directors. This quotation from a veteran professor illustrates this trend:

> *Quite frankly, the issue is, are we doing anything for [the students in the teacher preparation program]? I'm a traditional lecturer, and we look at what they're doing in the high school. Sometimes I have to wonder, is what I'm doing – even though I'm good at it – is it really pertinent to what they're teaching? I'm wondering what their students think, who are doing some of these really creative things such as PowerPoint…what do they think of what they learned in our classes? How useful that is? I've given them all sorts of information…maybe the younger people know how to do things that are innovative, people doing things out there in the high school…I mean, I feel like I'm in the dark ages!*

However, the direction of change could easily be reversed, once the university faculty members begin teaching their restructured courses throughout the teacher preparation program, and the teacher candidates begin to carry their newfound expertise and skills into their student teaching experiences. Moreover, learning communities that link the university Activity System with the K-12 Activity System could change this whole dynamic by sharing information between the K-12 schools and the SCDE. This is a fruitful area for further investigation that could both clarify and add predictive validity to TALENT's grant efforts.

Project TALENT learning communities are currently engaged in joint activities that will be completed by the end of the current academic term. Preliminary findings will be presented at Ed-Media.

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